During his long tenure of a Fellowship in Trinity College, Prof. Sedgwick witnessed great changes in the mathematical training, and contributed as much as any man to the present favourable condition of Science in Cambridge.

To defend the University against hasty imputations, to maintain a high standard of moral philosophy, and a dignified preference for logical induction to alluring hypothesis was always in his thoughts. Hence the "Discourse on the Studies of the University of Cambridge," at first an eloquent sermon, grew by prefix and suffix to a volume which he himself likened to a wasp—large in front and large behind, with a very fashionable waist.

Under such feelings he spoke out against the "Vestiges of Creation" with a fervour of argument and declamation which must have astonished the unacknowledged author of that once popular speculation. Nor was he silent when the views of Darwin came to fill the void places of biological theory, against which he not only used a pen of steel but made great use of his heavy hammer.

The vigour—vehemence we may call it—of his pen and tongue in a matter which touched his sense of justice, morals, or religion, might mislead one who did not thoroughly know his truth and gentleness of heart, to suppose that anger was mixed with his honest indignation—

ου γαρ μειλιχος εσκε . . . εν δαϊ λυγρῃ

But it was quite otherwise. In a letter addressed to the writer, in reply to some suggestion of the kind, he gave the assurance that he was resolved "no ill blood" should be caused by the discussion which had become inevitable.

He never failed in courtesy to the honest disputant whose arguments he mercilessly "contunded." Taken altogether, Professor Sedgwick was a man of grand proportion, cast in a heroic mould. Pressed in early life through a strict course of study, he found himself stronger by that training than most of his fellow geologists, but never made them feel his superiority. Familiar with great principles, and tenacious of settled truths, he was ready to welcome and encourage every new idea which appeared to be based on facts truly observed, and not unprepared or unwilling to stand, even if alone, against what he deemed unfair objection or unsubstantial hypothesis.

This is not the place to speak of his private worth, or to indulge in reminiscence of his playful and exuberant fancy, the source of unfailing delight to those who knew him in his happier hours. Unmarried, but surrounded by plenty of cheerful relatives, his last hours of illness were soothed by sedulous affection; his kindly disposition no suffering could conceal; his lively interest in passing events nothing could weaken. Ever

"Against oppression, fraud, or wrong,
His voice rose high, his hand waxed strong."

With collected mind, on the verge of the grave, he would express, with undiminished interest, his latest conclusions on his own Cambrian system, purely as a matter of scientific discussion, free from all personal considerations. It will be well if this mode of treatment be reverently followed by those who while speaking of Protozoic and Palæozoic Rocks, know enough to feel how much they have been benefited by the disinterested labours of a long and noble life.

JOHN PHILLIPS

PALMIERI'S VESUVIUS

The Eruption of Vesuvius in 1872. By Prof. Palmieri, Director of the Vesuvian Observatory. With Notes and an Introductory Sketch, &c. By Robert Mallet, F.R.S. (London: Asher and Co., 1873.)

THAT, in these days of rapid intercourse, the re-appearance of volcanic phenomena on the large scale in any part of the earth's surface should awaken a far more than mere local interest, was well illustrated in the case of the late great outbreak of Mount Vesuvius, during the continuance of which the telegraphic bulletins received from the fiery mountain became the subject of general inquiry and discussion in all parts of the civilised world; and even now that the eruption has entirely subsided, the publication of a translation by Mr. Mallet, of the report of the well-known Italian *savant,* Professor Palmieri, entitled "Incendio Vesuviano del 26 Aprile, 1872," will be welcomed as a valuable contribution to English scientific literature quite independently of its being a book likely to secure numerous readers amongst the non-scientific public also.

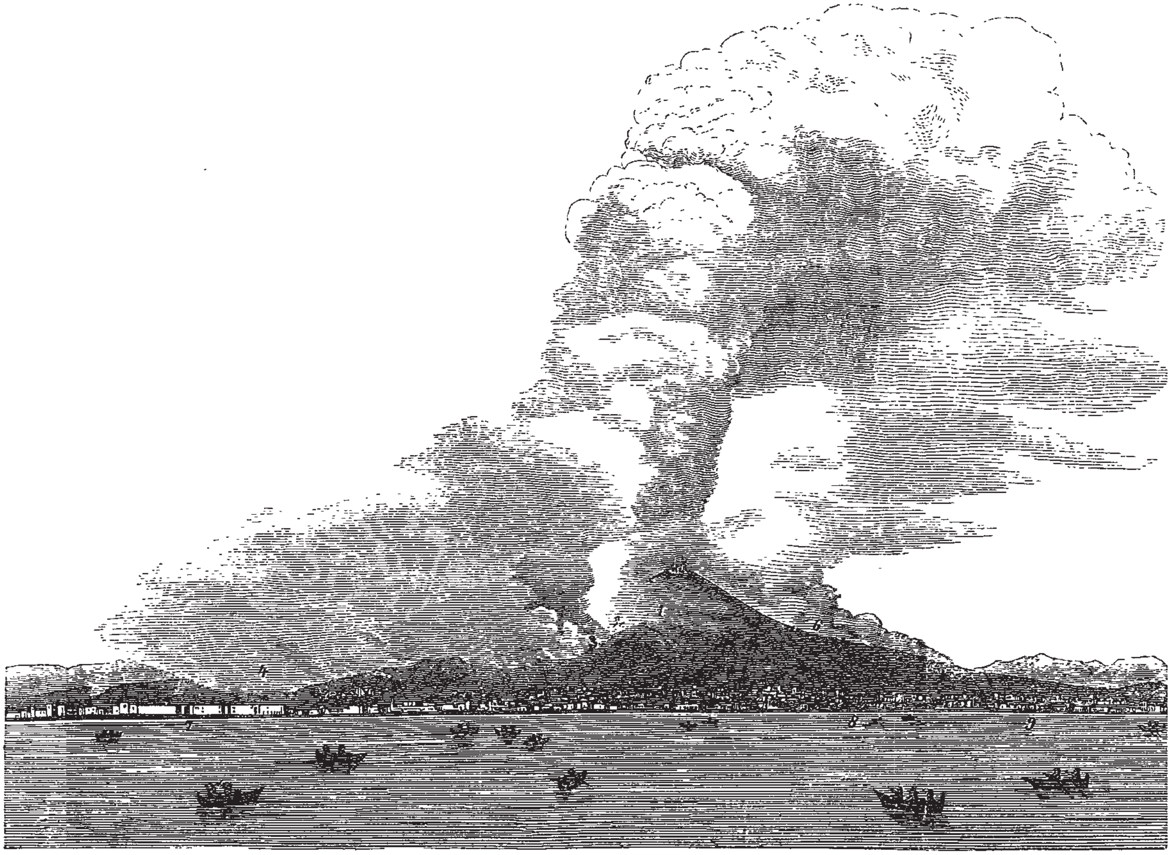
This report of Professor Palmieri, who so courageously stuck to his post in the Observatory on the side of Mount Vesuvius, when that building actually stood between two torrents of liquid fire, the heat from which cracked the glass in the windows and even scorched the very habitation itself, is one of the most important records of volcanic phenomena which we possess. Written in the most unassuming style, it does not go into theoretical points, but confines itself all but entirely to recording such facts as were considered by its author to be important or interesting from a scientific point of view, alluding only incidentally to the destruction caused by the lava and ashes on the morning of April 26. In point of fact it is to be regarded as a scientific rather than a popular description of the eruption. Although the professor specially excels in details, the main features of the different phases of the eruption are well described, and a vivid impression of the enormous force developed on such occasions is conveyed by his observation that on April 26 the volume of smoke, ashes, lava fragments and bombs projected upwards from the crater attained a height of no less than 1,300 metres (4,265 feet) above its edge.

The report itself contains a mass of data calculated to be of invaluable assistance in the future investigation of volcanic phenomena, and although it may be said that the conclusions arrived at from the study of this eruption, do not present us with any strikingly new or startling deductions, their great value lies in the corroboration or correction of those resulting from previous observations. Amongst these may be mentioned, the opinion now held by the professor, that to a certain extent eruptions may be predicted, which he bases upon the observations that when the central crater commences to be agitated, this is followed by a series of slight convulsions which terminate in a grand outbreak or eruption, after which the volcano first settles down again into a state of repose; the evidence brought forward to prove the crystallisation of the leucite out of the fluid lava and against its pre-existence in it, as has been assumed by some previous writers; the order of appearance of the acid vapours; the constant presence of certain metallic compounds and sublimates;

and the respective electrical conditions of the smoke and ashes.

The report is illustrated by eight plates of the instruments employed at the Vesuvian observatory, and of views of the eruption in its different stages, which latter, however, as is frequently the case when taken from photographs, cannot be regarded as altogether satisfactory; the translation is done with evident care, but the nomenclature is open to objections, especially when such terms as sulphide of potash and ferrochloride of ammonia are encountered.

The introductory sketch by which the translation is prefaced, occupies 90 out of 148 pages, and must be regarded as quite a distinct treatise, being only indirectly connected with the report on Vesuvius; and its style, which cannot be regarded as an agreeable one, is not very gracious to the labours of the many eminent men who have preceded or now hold views differing from those of the author. Although brought forward as representing the present state of knowledge of terrestrial vulcanicity, we find no reference to any of the continental men of science, who have done so much in this direction, and it should be more correctly entitled an exposition of the author's views on seismology and what he terms vulcanology, the first 46 pages being but an abstract of his previously published investigations into the phenomena of earthquakes.



Vesuvius, on April 26, 1872, from a Photograph. 1 The Observatory.—2. Fossa della Vetrana. 3. Eruption of Smoke and Ashes, with Stones, from the Surface of the Lava. 4. The Novelle, St. Sebastiano, and Massa. 5. Lava which took the direction of Resina. 6 Lava which, from the Crater, took the direction of the Camaldoli 7. The Grain Stores, near Naples. 8. Resina. 9. Torre del Greco. 10. The Camaldoli.

The second part of this sketch is a *résumé* of the main features of Mr. Mallet's dynamical theory of volcanic energy, published in the Proceedings of the Royal Society for 1872, a hypothesis which explains volcanic action as originating in the secular cooling of our globe, when, to use the words of the abstract, "As the solid crust sinks together to follow down after the shrinking nucleus, the work expended in mutual crushing and dislocation of its parts is transformed into heat, by which, at the places where the crushing sufficiently takes place, the material of the rock so crushed, and that adjacent to it, are heated even to fusion. The access of water to such points determines volcanic eruption." To one who, like Mr. Mallet, assumes that heat, and heat alone, is in the first instance all that is required to account for the varied phenomena of volcanic activity, this explanation may appear satisfactory enough, although even if it be proved experimentally that the intensity of the heat thus produced in such cracks of contraction, or faults, as a geologist would probably term them, is sufficient to fuse the substance of the rocks in immediate contact, it would nevertheless be found even still more difficult to account for the quantity of heat requisite to melt up such vast volumes of rock matter as are known to proceed from volcanoes. Allowing, however, that even this difficulty can be satisfactorily explained away—and it is admitted that the conversion of the mechanical force into heat is sufficient to effect the melting part of the operation—there remains the still greater difficulty of explaining the chemical and mineralogical features which characterise volcanic phenomena. For although mechanical force is admitted to be convertible into its equivalent in heat, which heat may in its turn set in operation chemical action, still no such forces, either alone or combined, can transmute one chemical element into another, or bring about the formation of products having at all times a definite chemical and mineralogical constitution, out of the incongruous materials likely to be met with on the sides of such faults, or cracks, or contraction. Our present knowledge of the mineral characters of the earth's crust does not entitle us to entertain the supposition that the substance of the rocks immediately contiguous to fissures of this character occurring in so many different parts of the globe, could in all, or even in other than solitary instances, when fused by the action of mere heat, afford products identical with those of known volcanoes. On the other hand, nothing is more certain, from the examination of volcanic products, than that, no matter from what part of the world they be derived, whether from volcanoes situated near the north or south poles, in the islands of the Pacific or Atlantic oceans, or from the craters of the Andes or the Apennines, they are all identical in chemical or mineralogical constitution—a result which indicates forcibly that that they must be derived from some one common source, and not be mere local accidents, as Mr. Mallet's hypothesis would require us to assume. For these and other reasons which we need not bring forward on the present occasion, it does not seem probable that this hypothesis will receive the adherence of either chemist, mineralogist, or geologist.

In conclusion, attention might here be directed to the disadvantages which, in a pecuniary point of view, the British student labours under when making himself acquainted with foreign science by means of translations. The original pamphlet of Prof. Palmieri in Italian, and its translation into German by the eminent chemist, Rammelsberg, were procured here in London for the small sum of eighteenpence each, whereas English translations of scientific works, got up, however, in superior paper, wide margin, and elaborate covers, can rarely (if ever) be obtained under several times the cost of the original works.

David Forbes

OUR BOOK SHELF

Human Physiology the Basis of Sanitary and Social Science. By T. L. Nichols, M.D. Pp. 479; woodcuts. (Trübner, 1872.)

The title "Human Physiology," which alone appears on the back of this book, is misleading, and even the title as given above would scarcely prepare a reader for what he will find. The preface, however, gives fair warning. "Physiology," writes Dr. Nichols, "the science of life, has been handed over to the medical profession, which has an unfortunate interest in the popular ignorance of sanitary laws; while metaphysicians, moralists, and theologians have confused rather than enlightened our ideas "as to the moral nature of man and his consequent social requirements." This seems rather hard on the doctors, who have certainly done all that has yet been done in preaching the laws of health and in getting them carried out, both by public supervision or compulsion and by private influence; but the whole volume is an exemplification of the latter part of the melancholy result, whether due to those designing persons who study metaphysics, morals, and theology or to some other cause. Dr. Nichols is an ardent advocate of the numerous theories which blind and bigoted Science has consistently and universally refused to accept, to the great disgust of circle-squarers, anti-Newtonians, popular "scientists," and Social-Science-mongers. The first section of the book treats of preventible mortality, poverty, ignorance, drunkenness, and prostitution; the second of matter, force, and life, including adverse criticism, on the feeblest grounds, of the doctrines of evolution and of materialism, with some remarkable "proofs of immortality." The third part gives a popular account of the human body, with some of the oddest illustrations ever printed. The fourth treats of the laws of generation, including chapters on love and marriage, hereditary transmission, and problems of the sexual relation. This section is, perhaps, the best in the book, and its subjects are handled with freedom and modesty, while the conclusions are sensible enough. The fifth, part on health, disease, and cure, contains a good many useful and obvious remarks on the value of cleanliness, exercise, and temperance, together with a number of utterly unsupported or demonstrably false propositions. The last part, is devoted to the discussion of morals and society, in which important questions in political economy, ethics, agriculture, are stated, benevolent wishes for all classes of mankind are expressed, and the questions left much as they were found.

In a book of this kind the reader is not surprised to encounter the old and new dogmas of phrenology, vegetarianism, clairvoyance, homœopathy, animal magnetism, anti-vaccination, and cure by Psychic force. But though unscientific and sometimes anti-scientific, the author would deserve credit for putting before the public information which, however trite, is too little acted on, if his assertions of the wonderful cures he has made by hydropathy at Malvern, and the quotation from "a little book," by Mrs. Nichols on the same subject, did not suggest a doubt whether in his case singleness of motive can be admitted in excuse of ignorance.

P. S.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.*]

Dr. Bastian's Experiments

Mr. Lankester asks me several questions relating to the experiments by Dr. Bastian, reported by me in Nature a few weeks ago. In reply I beg to say that new Cheddar cheese was used. The cheese was not weighed, but the quantity added to the contents of each flask probably did not exceed two grains. The turnip infusion was filtered before it was introduced into the flasks: the filtrate was limpid. After boiling, the liquid was somewhat turbid, and contained visible particles.

Feb. 3 J. Burdon Sanderson

Eyes and No Eyes

Mr. Ray Lankester's letter has reminded me of a little experiment of my own which converted me to Bastianism. I had some turnip and cheese flasks which Dr. Bastian had been kind enough to prepare in my presence. I took them home and in due time examined the contents in a good microscope, using what I thought adequate power. I saw nothing, and went triumphant to Dr. Bastian to report my failure, taking the flasks with me. Dr. Bastian looked at the fluid, smelt it, and told me he would eat his hat if it was not full of life. I thought he would have to eat his hat. He put a drop under his microscope and told me to look. It was full of small Bacteria. I was a good deal puzzled at first, but after a little discussion I found out why I had failed to see what was in the fluid. Without going into details, I may say that the short result was that I had been rather a muff with the microscope. May not this explain some other failures?—not Mr. Lankester's, of course.

Query